

PRESENTATION: ORAL PRESENTATION (FAST PRESENTATION)

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964 – Molecular signature of circulating miRNAs 21 and 145 in predicting chemotherapy response in breast cancer: a systematic review

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Introduction: Breast cancer exhibits marked biological heterogeneity, resulting in variable responses to chemotherapy. The lack of accurate predictive biomarkers in clinical practice limits therapeutic personalization and exposes patients to unnecessary toxicities. In this context, circulating microRNAs (miRNAs) have emerged as promising liquid biopsy tools. The identification of a signature based on functionally opposing miRNAs, such as miR-21 (an oncomiR) and miR-145 (a tumor suppressor), is justified by the need for minimally invasive markers capable of enabling early prediction of chemosensitivity, thereby optimizing clinical management.

Objective: To evaluate the predictive value of plasma miR-21 and miR-145, measured simultaneously, in chemotherapy response among women with breast cancer.

Methods: A systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and registered in PROSPERO (CRD420251230261). PubMed, Embase, and Scopus databases were searched through May 2025. Eligible studies included those that simultaneously analyzed both miRNAs in plasma and reported treatment response outcomes. Study selection and data extraction were performed by two independent reviewers, with risk of bias assessed using the QUADAS-2 tool.

Results: Of the 1,723 records identified, three studies (n=353 patients) met the inclusion criteria. Two studies demonstrated that higher levels of miR-145 and lower levels of miR-21 were significantly associated with a positive response, highlighting their opposing biological roles in chemoresistance. One study found no significant association. A high risk of bias was observed in most positive findings, mainly due to the case-control design and the post hoc selection of cutoff points.

Conclusion: The combined evaluation of miR-21 and miR-145 represents a biologically plausible panel for predicting chemotherapy response. However, current evidence is limited by methodological heterogeneity. Large-scale prospective studies and standardized protocols are essential to validate this molecular signature before its implementation in clinical practice.

Ethics: Public data – Literature review.

Registry: International Prospective Register of Systematic Reviews (PROSPERO), CRD420251230261.

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Keywords: breast cancer; treatment; prognosis.